

What is claimed is:

- 1 1. An apparatus, comprising  
2 a catheter having a lumen;  
3 a conductive element disposed along the catheter; and  
4 a balloon having an interior in fluid communication with the lumen of the  
5 catheter, the balloon being formed of a conductive material conductively coupled to the  
6 conductive element, the balloon having a collapsed configuration and an expanded  
7 configuration.
- 1 2. The apparatus of claim 1, wherein:  
2 the balloon in the expanded configuration having a size associated with a  
3 previously-formed tissue cavity.
- 1 3. The apparatus of claim 1, wherein:  
2 the conductive material of the balloon includes a plurality of conductive  
3 portions, two adjacent conductive portions from the plurality of conductive portions  
4 being separated by an insulation portion from a plurality of insulation portions.
- 1 4. The apparatus of claim 1, wherein:  
2 the conductive material is a first layer of balloon, the balloon further including a  
3 second layer and a third layer, the second layer of the balloon being formed of an  
4 insulation material, the third layer of the balloon being formed of a second conductive  
5 material.
- 1 5. The apparatus of claim 1, wherein:  
2 the conductive material is a first layer of balloon, the balloon further including a  
3 second layer and a third layer, the second layer of the balloon being formed of an  
4 insulation material, the third layer of the balloon being formed of a second conductive  
5 material,  
6 the first layer of the balloon includes a plurality of conductive portions, two  
7 adjacent conductive portions from the plurality of conductive portions of the first layer  
8 of the balloon being separated by an insulation portion from a plurality of insulation  
9 portions,
- 10 the third layer of the balloon includes a plurality of conductive portions, two  
11 adjacent conductive portions from the plurality of conductive portions of the third layer

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12 of the balloon being separated by an insulation portion from a plurality of insulation  
13 portions,

14 each conductive portion from the plurality of conductive portions of the first  
15 layer of the balloon being offset from a corresponding conductive portion from the  
16 plurality of conductive portions of the third layer of the balloon.

1 6. The apparatus of claim 1, further comprising:

2 the conductive material being a first layer of balloon, the balloon further  
3 including a second layer and a third layer, the second layer of the balloon being formed  
4 of an insulation material, the third layer of the balloon being formed of a second  
5 conductive material,

6 the first layer and the third layer of the balloon each being a bipolar electrode.

1 7. The apparatus of claim 1, the lumen of the catheter being a first lumen, wherein:

2 the catheter has a first end portion, a second end portion and a second lumen, the  
3 first end portion of the catheter being disposed within the balloon, the first end portion  
4 of the catheter having an inlet associated with the first lumen and an outlet associated  
5 with the second lumen,

6 a fluid regulator coupled to the second end portion of the catheter, the fluid  
7 regulator configured to circulate a fluid at a temperature within the balloon less than a  
8 temperature of the conductive material of the balloon.

1 8. The apparatus of claim 1, the balloon is a first balloon, the lumen of the catheter  
2 being a first lumen, further comprising:

3 a second balloon disposed outside of the first balloon, the second balloon being  
4 fluid permeable, the catheter including a second lumen in fluid communication with the  
5 second balloon.

1 9. The apparatus of claim 1, the balloon is a first balloon, the lumen of the catheter  
2 being a first lumen, further comprising:

3 a second balloon disposed outside of the first balloon, the second balloon being  
4 fluid permeable, the catheter including a second lumen in fluid communication with the  
5 second balloon; and

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6        a fluid regulator coupled to the second lumen of the catheter, the fluid regulator  
7        configured to control a rate of fluid per fusing from the second balloon based on an  
8        impedance associated with the second balloon.

1        10.      The apparatus of claim 1, further comprising:  
2                an atraumatic tip disposed at a distal end of the balloon.

1        11.      The apparatus of claim 1, further comprising:  
2                a guide wire disposed within the lumen of the catheter and an interior of the  
3        balloon.

1        12.      The apparatus of claim 1, further comprising:  
2                the catheter has a first non-conductive layer, a second non-conductive layer and  
3        a conductive layer, the conductive layer being disposed between the first non-  
4        conductive layer and the second non-conductive layer, the conductive layer being  
5        electrically coupled to the conductive material of the balloon.

1        13.      A method for operating a catheter having a balloon in communication with the  
2        catheter, comprising:  
3                percutaneously disposing the balloon into a previously-formed tissue cavity  
4        while the balloon is in a collapsed configuration, the balloon being formed of a  
5        conductive material;  
6                expanding the balloon into an expanded configuration, the balloon in the  
7        expanded configuration having a shape associated with a shape of the previously-  
8        formed tissue cavity; and  
9                applying a radio-frequency signal to the conductive portion of the balloon.

1        14.      The method of claim 13, further comprising:  
2                circulating a fluid within the balloon, the fluid within the balloon having a  
3        temperature less than a temperature of the conductive material of the balloon.

1        15.      The method of claim 13, the balloon being a first balloon, the catheter including  
2        a second balloon disposed outside the first balloon and being fluid permeable, further  
3        comprising:  
4                providing a fluid within a second balloon.

1       16.    The method of claim 13, the balloon being a first balloon, the catheter including  
2    a second balloon disposed outside the first balloon and being fluid permeable, further  
3    comprising:

4               providing a fluid within a second balloon based on an impedance associated  
5    with the tissue cavity.

1       17.    The method of claim 13, the applying including modifying the shape of the  
2    previously-formed tissue cavity into a substantially spherical shape, the method further  
3    comprising:

4               removing the balloon from the modified tissue cavity;  
5               inserting a radiation therapy device into the modified tissue cavity; and  
6               performing radiation therapy based on the radiation therapy device.

1       18.    A apparatus for treating a margin tissue associated with a tissue cavity after  
2    removal of a tissue mass, comprising:

3               a tubular member defining a lumen; and  
4               a balloon having at least one electrode and defining an interior in fluid  
5    communication with the lumen of the tubular member, the balloon having a range of  
6    configurations including an expanded configuration corresponding to the tissue cavity  
7    and a collapsed configuration.

1       19.    The apparatus of claim 18, wherein:

2               the at least one electrode of the balloon is formed with the balloon.

1       20.    The apparatus of claim 18, wherein:

2               the at least one electrode of the balloon includes a plurality of conductive  
3    portions, two adjacent conductive portions from the plurality of conductive portions  
4    being separated by an insulation portion from a plurality of insulation portions.

1       21.    The apparatus of claim 18, wherein:

2               the at least one electrode is disposed within a first layer of balloon, the balloon  
3    further including a second layer and a third layer, the second layer of the balloon being

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4      formed of an insulation material, the third layer of the balloon being formed of its own  
5      at least one electrode.

1      22.     The apparatus of claim 21, further comprising:  
2              a radio-frequency generator coupled to the at least one electrode of the first layer  
3              of the balloon and the at least one electrode of the third layer of the balloon, the first  
4              layer of the balloon and the third layer of the balloon defining a bipolar configuration.

1      23.     A method for making an expandable ablation balloon formed of a conductive  
2      material and having a first portion and a second portion, comprising:  
3              masking the first portion of a balloon based on a mask;  
4              depositing an insulation layer on the second portion of the balloon;  
5              depositing a conductive layer on the second portion of the balloon; and  
6              removing the mask from the first portion of the balloon.

1      24.     The method of claim 23, the insulation layer being a first insulation layer, the  
2      method further comprising:  
3              depositing a second insulation layer on the second portion of balloon before the  
4      removing the mask from the first portion of the balloon.

1      25.     The method of claim 23, the insulation layer being a first insulation layer, the  
2      method further comprising:  
3              depositing a second insulation layer on the first portion of the balloon and the  
4              second portion of the balloon after the removing the mask from the first portion of the  
5      balloon.